

What is claimed is:

1. A system for extending the effective distance of digital subscriber line service, the system comprising:

a central office terminal, the central office terminal including:

a data interface; and

a plurality of line units;

at least one communication link, coupled to one of the plurality of line units, that carries signals using digital subscriber line service;

at least one remote access multiplexer, coupled to the at least one communication link, wherein the at least one remote access multiplexer includes a plurality of ports that are adapted to provide digital subscriber line service;

the remote access multiplexer adapted to multiplex signals between the plurality of ports and the at least one communication link; and

wherein the at least one remote access multiplexer is located at a distance from the central office terminal so as to provide digital subscriber line service to user terminals that are located more than 12 kilofeet from the central office terminal.

2. The system of claim 1, wherein the central office further includes a telephony interface.

3. The system of claim 1, wherein the at least one remote access multiplexer is located at a distance from the central office terminal so as to provide digital subscriber line service to user terminals that are located between 12 and 30 kilofeet from the central office terminal.

4. The system of claim 1, and further including a splitter at the remote access multiplexer that provides telephony service over the ports of the remote access multiplexer.

5. The system of claim 1, wherein the at least one communication link provides single high speed digital subscriber line service.

6. The system of claim 1, wherein the at least one communication link comprises four communication links.
7. The system of claim 1, wherein the remote access multiplexer is powered over the at least one communication link to support lifeline plain old fashion telephone service.
8. The system of claim 1, wherein each of the at least one communication links supports up to 8 ports of a corresponding remote access multiplexer.
9. The system of claim 1, wherein the central office terminal is located at a central office.
10. The system of claim 1, wherein the central office terminal is subtended from a remote unit of a digital loop carrier.
11. The system of claim 1, wherein the central office terminal is a digital loop carrier.
12. A system for providing multi-line telephony service and digital subscriber line service over a common connection, the system comprising:
a central office terminal, the central office terminal including:
a data interface;
a telephony interface; and
a plurality of line units;
a communication link coupled to one of the plurality of line units;
at least one remote terminal, coupled to the communication link, the remote terminal powered over the communication link; and
wherein the remote terminal supports service for at least two telephony lines and digital subscriber line over the communication link.
13. The system of claim 12, wherein the remote terminal uses a portion of the digital subscriber line service bandwidth for telephony service.

14. The system of claim 12, wherein the remote terminal supports service for up to three telephony lines and one digital subscriber line.
15. The system of claim 12, wherein the remote terminal supports service for up to six telephony lines and one digital subscriber line.
16. The system of claim 12, wherein the central office terminal is located at a central office.
17. The system of claim 12, wherein the central office terminal is subtended from a remote unit of a digital loop carrier.
18. The system of claim 12, wherein the central office terminal is a digital loop carrier.
19. A system for providing multi-line telephony service and digital subscriber line service over a common connection, the system comprising:
- a central office terminal, the central office terminal including:
 - a data interface;
 - a telephony interface; and
 - a plurality of line units;
 - a communication link coupled to one of the plurality of line units;
 - at least one remote terminal, coupled to the communication link, the remote terminal powered over the communication link; and
- wherein the remote terminal dynamically shares bandwidth between a plurality of telephony line and digital subscriber line services.
20. The system of claim 19, wherein the remote terminal supports service for up to three telephony lines and one digital subscriber line.
21. The system of claim 19, wherein the remote terminal supports service for up to six telephony lines and one digital subscriber line.

22. The system of claim 19, wherein the central office terminal is located at a central office.

23. The system of claim 19, wherein the central office terminal is subtended from a remote unit of a digital loop carrier.

24. The system of claim 19, wherein the central office terminal is a digital loop carrier.

25. A remote access multiplexer, comprising:

a first port, adapted to be coupled to a central office terminal over a communication link;

a plurality of subscriber ports, adapted to be coupled to a plurality of communication links; and

at least one multiplexer unit, coupled to the first port and the plurality of subscriber ports, the multiplexer unit adapted to multiplex signals between the first port and the plurality of subscriber ports to provide digital subscriber line service to subscribers at a distance up to 30 kilofeet from the central office terminal.

26. The remote access multiplexer of claim 25, wherein the multiplexer unit uses single pair high-speed digital subscriber line service at the first port.

27. The remote access multiplexer of claim 25, wherein the multiplexer unit uses asymmetric digital subscriber line service at the plurality of subscriber ports.

28. A system for extending the effective distance of digital subscriber line service, the system comprising:

a central office terminal, the central office terminal including:

a data interface, and

a plurality of line units;

at least one communication link, coupled to one of the plurality of line units, that carries signals using digital subscriber line service;

at least one remote access multiplexer, coupled to the at least one communication link, wherein the at least one remote access multiplexer includes:

a first port, adapted to be coupled to the at least one communication link,
a plurality of subscriber ports, adapted to be coupled to a plurality of communication links, and

at least one multiplexer unit, coupled to the first port and the plurality of subscriber ports, the multiplexer unit adapted to multiplex signals between the first port and the plurality of subscriber ports; and

wherein the at least one remote access multiplexer is located at a distance from the central office terminal so as to provide digital subscriber line service to user terminals that are located more than 12 kilofeet from the central office terminal.

29. The system of claim 28, wherein the central office terminal further includes a telephony interface.

30. The system of claim 28, wherein the at least one remote access multiplexer is located at a distance from the central office terminal so as to provide digital subscriber line service to user terminals that are located between 12 and 30 kilofeet from the central office terminal.

31. The system of claim 28, and further including a splitter at the remote access multiplexer that provides telephony service over the ports of the remote access multiplexer.

32. The system of claim 28, wherein the at least one communication link provides single high speed digital subscriber line service.

33. The system of claim 28, wherein the at least one communication link comprises four communication links.

35. The system of claim 28, wherein each of the at least one communication links supports up to 8 ports of a corresponding remote access multiplexer.

36. The system of claim 28, wherein the central office terminal is located at a central office.

37. The system of claim 28, wherein the central office terminal is subtended from a remote unit of a digital loop carrier.

38. The system of claim 28, wherein the central office terminal is a digital loop carrier.

39. An integrated access device, comprising:

a network port, adapted to be coupled to a communication link, wherein the network port receives power for the integrated access device over the communication link;

a plurality of telephony ports;

a data port; and

a circuit that multiplexes signals between the network port and the plurality of telephony ports and the data port to provide data service and telephony service for a plurality of lines over a common communication link.

40. The integrated access device of claim 39, wherein the data service comprises digital subscriber line service.

41. The integrated access device of claim 39, wherein the plurality of telephony ports comprises up to 8 telephony ports.

42. The integrated access device of claim 39, wherein the circuit that multiplexes signals shares bandwidth between the telephony and data services.
43. A system for extending the effective distance of asymmetric digital subscriber line service, the system comprising:
- a central office terminal, the central office terminal including:
 - a data interface;
 - a telephony interface; and
 - a plurality of line units;
 - at least one communication link, coupled to one of the plurality of line units, that carries signals using single pair high speed digital subscriber line service;
 - at least one remote access multiplexer, coupled to the at least one communication link, wherein the at least one remote access multiplexer includes a plurality of ports that are adapted to provide asymmetric digital subscriber line service;
 - the remote access multiplexer adapted to multiplex signals between the plurality of ports and the at least one communication link; and
 - wherein the at least one remote access multiplexer is located at a distance from the central office terminal so as to provide digital subscriber line service to user terminals that are located more than 12 kilofeet from the central office terminal.
44. The system of claim 43, wherein the central office terminal is a digital loop carrier.
45. A system for providing digital subscriber line service, the system comprising:
- a central office terminal, the central office terminal including:
 - a data interface;
 - a telephony interface; and
 - a plurality of line units;
 - a first communication link coupled to one of the plurality of line units;
 - at least one remote terminal, coupled to the first communication link, the remote terminal powered over the first communication link;

wherein the remote terminal supports service for at least two telephony lines and digital subscriber line over the first communication link;

a second communication link, coupled to one of the plurality of line units, that carries signals using digital subscriber line service;

at least one remote access multiplexer, coupled to the second communication link, wherein the at least one remote access multiplexer includes a plurality of ports that are adapted to provide digital subscriber line service;

the remote access multiplexer adapted to multiplex signals between the plurality of ports and the second communication link; and

wherein the at least one remote access multiplexer is located at a distance from the central office terminal so as to provide digital subscriber line service to user terminals that are located more than 12 kilofeet from the central office terminal.

46. The system of claim 45, wherein the central office terminal is a digital loop carrier.

47. The system of claim 45, and further including a splitter at the remote access multiplexer that provides telephony service over the ports of the remote access multiplexer.

48. A method of provisioning digital subscriber line service, the method comprising:
accessing data for a plurality of users from a network;
combining the data at a central office terminal;
transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service;
receiving the combined data;
separating the data for distribution to designated users of the plurality of users;
and
distributing the data to each of the designated users using digital subscriber line service.

49. The method of claim 48, wherein transporting the combined data up to 12 kilo feet over a single communication link comprises transporting the combined data up to 12 kilo feet over a single communication link using single pair high-speed digital subscriber line service.

50. The method of claim 48, wherein distributing the data to each of the designated users comprises distributing the data to each of the designated users using asymmetric digital subscriber line service.

51. The method of claim 48, wherein transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service comprises transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service, wherein the single communication link is a single twisted pair.

52. The method of claim 48, wherein distributing the data to each of the designated users up to 18 kilo feet using digital subscriber line service comprises distributing the data to each of the designated users up to 18 kilo feet using digital subscriber line service over a single twisted pair.

53. A method of provisioning digital subscriber line service, the method comprising:
 accessing data for a plurality of users from a data network;
 combining the data at a central office terminal;
 transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service;
 receiving the combined data;
 separating the data for distribution to designated users of the plurality of users;
 combining the separated data with plain old-fashioned telephone service; and
 distributing the data and plain old-fashioned telephone service to each of the designated users using digital subscriber line service.

54. The method of claim 53, wherein transporting the combined data up to 12 kilo feet over a single communication link comprises transporting the combined data up to 12 kilo feet over a single communication link using single pair high speed digital subscriber line service.

55. The method of claim 53, wherein distributing the data and plain old-fashioned telephone service to each of the designated users comprises distributing the data and plain old-fashioned telephone service to each of the designated users using asymmetric digital subscriber line service.

56. The method of claim 53, wherein transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service comprises transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service, wherein the single communication link is a single twisted pair.

57. The method of claim 53, wherein distributing the data and plain old-fashioned telephone service to each of the designated users up to 18 kilo feet using digital subscriber line service comprises distributing the data and plain old-fashioned telephone service to each of the designated users up to 18 kilo feet using digital subscriber line service over a single twisted pair.

58. The method of claim 53, further comprises providing plain old fashioned telephone lifeline support to each of the designated users.

59. A method of provisioning digital subscriber line service, the method comprising:
accessing data for a plurality of users from a network;
combining the data at a central office terminal;
transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service;
receiving the combined data;
separating the data for distribution to designated users of the plurality of users;

distributing the data to each of the designated users up to 18 kilo feet using digital subscriber line service;

receiving data from the plurality of users;

multiplexing the received data onto the single communication link;

transporting the multiplexed data to the central office terminal over the single communication link; and

distributing the multiplexed data.

60. The method of claim 59, wherein transporting the combined data up to 12 kilo feet over a single communication link comprises transporting the combined data up to 12 kilo feet over a single communication link using single pair high-speed digital subscriber line service.

61. The method of claim 59, wherein distributing the data to each of the designated users comprises distributing the data to each of the designated users using asymmetric digital subscriber line service.

62. The method of claim 59, wherein transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service comprises transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service, wherein the single communication link is a single twisted pair.

63. The method of claim 59, wherein distributing the data to each of the designated users up to 18 kilo feet using digital subscriber line service comprises distributing the data to each of the designated users up to 18 kilo feet using digital subscriber line service over a single twisted pair.

64. A method of provisioning digital subscriber line service, the method comprising:
accessing data for a plurality of users from a network;
combining the data at a central office terminal;

transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service;

receiving the combined data;

separating the data for distribution to designated users of the plurality of users;

combining the separated data with plain old-fashioned telephone service;

distributing the data and plain old-fashioned telephone service to each of the designated users up to 18 kilo feet using digital subscriber line service;

receiving data from the plurality of users;

multiplexing the received data onto the single communication link;

transporting the multiplexed data to the central office terminal over the single communication link; and

distributing the multiplexed data.

65. The method of claim 64, wherein transporting the combined data up to 12 kilo feet over a single communication link comprises transporting the combined data up to 12 kilo feet over a single communication link using single pair high speed digital subscriber line service.

66. The method of claim 64, wherein distributing the data and plain old-fashioned telephone service to each of the designated users comprises distributing the data and plain old-fashioned telephone service to each of the designated users using asymmetric digital subscriber line service.

67. The method of claim 64, wherein transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service comprises transporting the combined data up to 12 kilo feet over a single communication link using digital subscriber line service, wherein the single communication link is a single twisted pair.

68. The method of claim 64, wherein distributing the data and plain old-fashioned telephone service to each of the designated users up to 18 kilo feet using digital subscriber line service comprises distributing the data and plain old-fashioned telephone

service to each of the designated users up to 18 kilo feet using digital subscriber line service over a single twisted pair.

69. The method of claim 64, further comprises providing plain old fashioned telephone lifeline support to each of the designated users.

70. A method of providing multi-line telephony service and digital subscriber line service over a common connection, the method comprising:

accessing data and voice for multiple telephony lines for a single user from one or more networks;

combining the data and voice for multiple telephony lines;

transporting the combined data and voice for multiple telephony lines over a common communication link, wherein bandwidth is shared between the data and the voice for multiple telephony lines;

receiving the combined data and voice for multiple telephony lines at a remote terminal;

providing the voice over multiple telephony lines to the single user;

providing the data using digital subscriber line service to the single user;

powering the remote terminal over the common communication link; and

providing plain old fashion telephone lifeline support to the single user.

71. The method of claim 70, wherein transporting the combined data and voice over a common communication link comprises transporting the combined data and voice over a single twisted pair.

72. A method of providing multi-line telephony service and digital subscriber line service over a common connection, the method comprising:

accessing data and voice for multiple telephony lines from one or more networks;

combining the data and voice for multiple telephony lines;

transporting the combined data and voice for multiple telephony lines over a common communication link, wherein bandwidth is shared between the data and the voice for multiple telephony lines;

receiving the combined data and voice for multiple telephony lines at a remote terminal;

providing the voice over multiple telephony lines;

providing the data using digital subscriber line service;

powering the remote terminal over the common communication link; and

providing plain old fashion telephone lifeline support.

73. The method of claim 70, wherein transporting the combined data and voice over a common communication link comprises transporting the combined data and voice over a single twisted pair.